

AMENDMENTS TO THE CLAIMS

Listing of Claims:

- 1-27. (Cancelled)
28. (New) A process for the production of one or more C₁₆–, C₁₈–, and/or C₂₀– polyunsaturated fatty acids in a transgenic organism comprising:
- a) introducing at least one nucleic acid sequence encoding a Δ-9-elongase into an organism, wherein said Δ-9-elongase comprises the amino acid sequence of SEQ ID NO: 4,
 - b) introducing at least one second nucleic acid sequence encoding a Δ-8-desaturase, wherein the Δ-8-desaturase comprises the amino acid sequence of SEQ ID NO: 2,
 - c) introducing at least one third nucleic acid sequence encoding a Δ-5-desaturase, wherein the Δ-5-desaturase comprises the amino acid sequence of SEQ ID NO: 6, and
 - d) cultivating and harvesting said organism,
wherein said organism is a plant or a microorganism.
29. (New) The process of claim 28, wherein the nucleic acid sequence encoding a Δ-9-elongase comprises the nucleic acid sequence of SEQ ID NO: 3.
30. (New) The process of claim 28, wherein the nucleic acid sequence encoding a Δ-8-desaturase comprising the nucleic acid sequence of SEQ ID NO: 1.
31. (New) The process of claim 28, wherein the nucleic acid sequence encoding a Δ-5-desaturase comprises the nucleic acid sequence of SEQ ID NO: 5.
32. (New) The process of claim 28, wherein the nucleic acid sequence encoding a Δ-9-elongase comprises the nucleic acid sequence of SEQ ID NO: 3, the nucleic acid sequence encoding a Δ-8-desaturase comprising the nucleic acid sequence of SEQ ID NO: 1, and the nucleic acid sequence encoding a Δ-5-desaturase comprises the nucleic acid sequence of SEQ ID NO: 5.
33. (New) The process of claim 28, wherein the plant is an oil producing plant.

34. (New) The process of claim 33, wherein the oil producing plant is selected from the group consisting of rapeseed, poppy, mustard, hemp, castor bean, sesame, olive, calendula, punica, hazel nut, almond, macadamia, avocado, pumpkin, walnut, laurel, pistachio, primrose, canola, peanut, linseed, soybean, safflower, sunflower and borage.

35. (New) The process of claim 28, wherein the polyunsaturated fatty acids are isolated in the form of oils, lipids or free fatty acids.

36. (New) The process of claim 28, wherein the polyunsaturated fatty acids have at least two double bonds.

37. (New) A process for the production of compounds comprising one or more C₁₆-, C₁₈-, and/or C₂₀-polyunsaturated fatty acids in a transgenic organism comprising:

- a) introducing at least one nucleic acid sequence encoding a Δ-9-elongase into an organism, wherein said Δ-9-elongase comprises the amino acid sequence of SEQ ID NO: 4,
- b) introducing at least one second nucleic acid sequence encoding a Δ-8-desaturase, wherein the Δ-8-desaturase comprises the amino acid sequence of SEQ ID NO: 2,
- c) introducing at least one third nucleic acid sequence encoding a Δ-5-desaturase, wherein the Δ-5-desaturase comprises the amino acid sequence of SEQ ID NO: 6, and
- d) cultivating and harvesting said organism,
wherein said organism is a plant or a microorganism.

38. (New) The process of claim 37, wherein the nucleic acid sequence encoding a Δ-9-elongase comprises the nucleic acid sequence of SEQ ID NO: 3.

39. (New) The process of claim 37, wherein the nucleic acid sequence encoding a Δ-8-desaturase comprising the nucleic acid sequence of SEQ ID NO: 1.

40. (New) The process of claim 37, wherein the nucleic acid sequence encoding a Δ-5-desaturase comprises the nucleic acid sequence of SEQ ID NO: 5.

41. (New) The process of claim 37, wherein the nucleic acid sequence encoding a Δ-9-elongase comprises the nucleic acid sequence of SEQ ID NO: 3, the nucleic acid sequence

encoding a Δ-8-desaturase comprising the nucleic acid sequence of SEQ ID NO: 1, and the nucleic acid sequence encoding a Δ-5-desaturase comprises the nucleic acid sequence of SEQ ID NO: 5.

42. (New) The process of claim 37, wherein the plant is an oil producing plant.
43. (New) The process of claim 42, wherein the oil producing plant is selected from the group consisting of rapeseed, poppy, mustard, hemp, castor bean, sesame, olive, calendula, punica, hazel nut, almond, macadamia, avocado, pumpkin, walnut, laurel, pistachio, primrose, canola, peanut, linseed, soybean, safflower, sunflower and borage.
44. (New) The process of claim 37, wherein the compounds are isolated in the form of oils, lipids or free fatty acids.
45. (New) The process of claim 37, wherein the polyunsaturated fatty acids have at least two double bonds.
46. (New) A process for increasing the content of fatty acids, oils or lipids containing C₁₆–, C₁₈–, and/or C₂₀–polyunsaturated fatty acids in an organism comprising:
 - a) introducing at least one nucleic acid sequence encoding a Δ-9-elongase into an organism, wherein said Δ-9-elongase comprises the amino acid sequence of SEQ ID NO: 4,
 - b) introducing at least one second nucleic acid sequence encoding a Δ-8-desaturase, wherein the Δ-8-desaturase comprises the amino acid sequence of SEQ ID NO: 2,
 - c) introducing at least one third nucleic acid sequence encoding a Δ-5-desaturase, wherein the Δ-5-desaturase comprises the amino acid sequence of SEQ ID NO: 6, and
 - d) cultivating and harvesting said organism,
wherein said organism is a plant or a microorganism.
47. (New) The process of claim 46, wherein the nucleic acid sequence encoding a Δ-9-elongase comprises the nucleic acid sequence of SEQ ID NO: 3.
48. (New) The process of claim 46, wherein the nucleic acid sequence encoding a Δ-8-desaturase comprising the nucleic acid sequence of SEQ ID NO: 1.

49. (New) The process of claim 46, wherein the nucleic acid sequence encoding a Δ -5-desaturase comprises the nucleic acid sequence of SEQ ID NO: 5.
50. (New) The process of claim 46, wherein the nucleic acid sequence encoding a Δ -9-elongase comprises the nucleic acid sequence of SEQ ID NO: 3, the nucleic acid sequence encoding a Δ -8-desaturase comprising the nucleic acid sequence of SEQ ID NO: 1, and the nucleic acid sequence encoding a Δ -5-desaturase comprises the nucleic acid sequence of SEQ ID NO: 5.
51. (New) The process of claim 46, wherein the plant is an oil producing plant.
52. (New) The process of claim 51, wherein the oil producing plant is selected from the group consisting of rapeseed, poppy, mustard, hemp, castor bean, sesame, olive, calendula, punica, hazel nut, almond, macadamia, avocado, pumpkin, walnut, laurel, pistachio, primrose, canola, peanut, linseed, soybean, safflower, sunflower and borage.
53. (New) The process of claim 46, wherein the polyunsaturated fatty acids have at least two double bonds.